

## Forest Use and Awareness of Environmental Conservation in Yakushima, Japan

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### Introduction

When considering forest conservation measures, it is important to understand how local residents perceive forests. Residents of Yakushima, an island south of Kyushu, Japan, distinguish forest areas as “maedake” and “okudake,” and have utilized these areas in distinct ways. Maedake forests contain broadleaved trees and are located at altitudes below 1200 m. Okudake are covered by coniferous or broadleaved trees and occupy higher altitudes. Almost all residents of Yakushima inhabit the coastal area and traditionally used maedake for fuels and fertilizers. In contrast, the islanders have long regarded okudake as sacred places and have prohibited resource extraction from these forests. Since the Edo period at the beginning of the seventeenth century, the island’s forests have also been known for providing timber from giant, ancient Japanese cedar trees called Yaku-sugi (lit. Yaku cedar).

In 1993 UNESCO designated part of Yakushima Island as a World Heritage Site, and residents have increasingly recognized the non-use values of their forests (e.g., as related to heritage and the existence of nature). Research by Kuriyama (2000) has also demonstrated that the value of Yakushima’s forests is mainly comprised of non-use values. In this study, we looked at how residents of Yakushima value local forests and examined their motivations for forest conservation. We classified respondents into three groups, based on their valuation of maedake, with the aim of clarifying which groups are most motivated to conserve the forest.

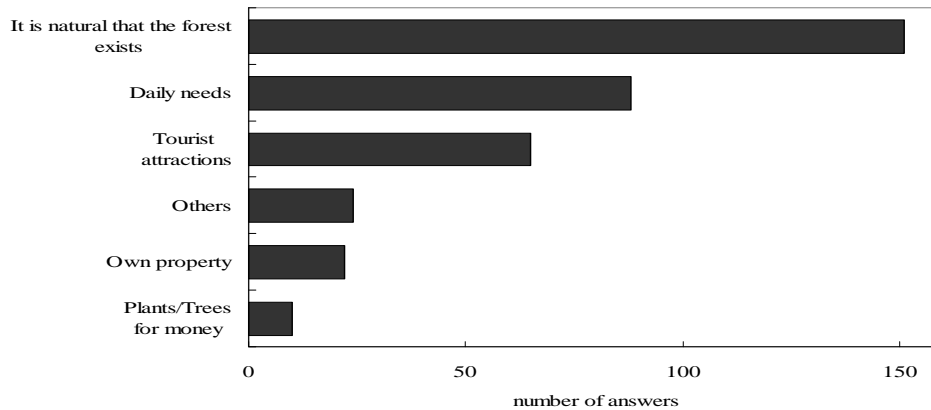
### Methods

From the population of all households in Yakushima (N = 3167, in 2002), we used simple random sampling from the telephone book to choose a subset of 1095 residents. We then mailed or directly distributed 1095 questionnaire sets in July 2002; of these, 263 sets were returned, for a response rate of 24 %. To analyze the relationship between valuation of maedake and awareness of forest conservation, we classified the respondents into three groups and compared these groups with respect to conservation awareness, frequency of forest use, and type of use.

### Results

Of the 263 respondents, 234 (89%) answered that the forest should be preserved. The survey then asked why the forest should be preserved. Respondents were allowed to choose two reasons from a list of six. The most frequent answer was that “it is natural that forest exists” (Fig. 1). We divided these reasons into two categories: use value and non-use value. The reasons “daily needs,” “tourist attraction,” “own property,” and “plants/trees

for money” were classified as use values, while “it is natural that forests exist” was classified into the non-use value. The results showed that local residents recognized both types of value.

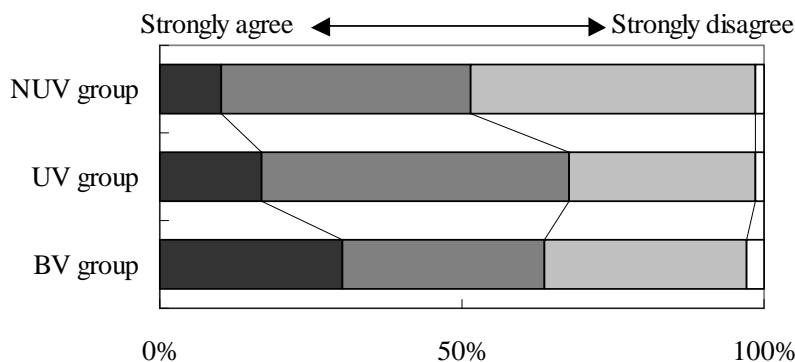


**Fig. 1** Reasons why broadleaved forest should be preserved

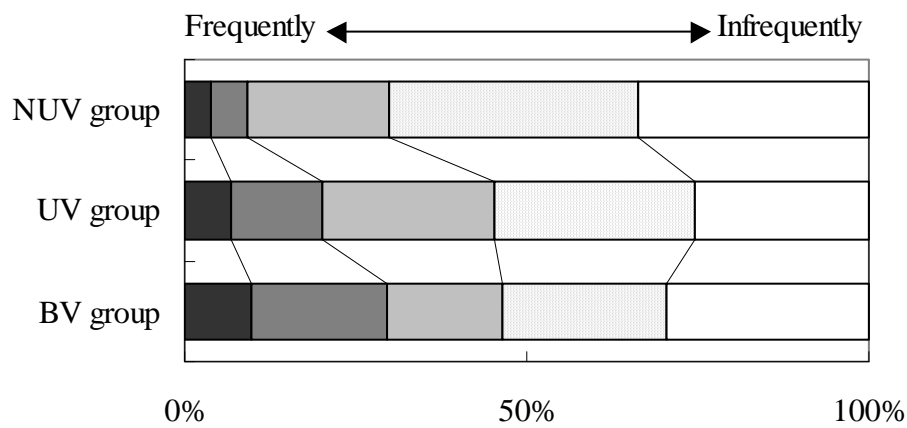
Next, we divided the respondents into three groups, based on how they valued the forests.

- (1) The non-use value group (NUV group): respondents who selected reasons classified as the non-use value.
- (2) Use value group (UV group): respondents who selected reasons classified as use value.
- (3) Both value groups (BV group): respondents who selected both non-use value and use value reasons.

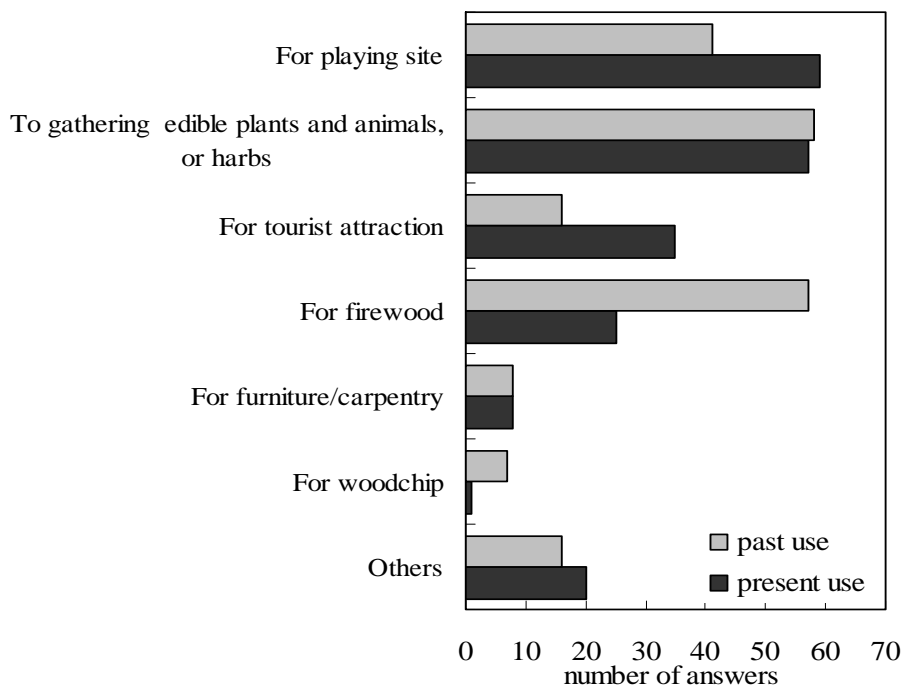
We compared these groups based on replies to “Would you prefer that the area of maedake be increased?” The five answer choices ranged from “strongly agree” to “strongly disagree.” This question was designed to determine whether the respondent felt positive with regard to broadleaved forest conservation. Compared to the NUV group, the UV and BV groups were more positive with regard to increasing the forest (Fig. 2). The BV group used forests more frequently than the UV or NUV groups did (Fig. 3). Figure 4 shows present and past use of the broadleaved forest. Classifying use into two categories (direct use and indirect use) showed that the UV group tended to use the forest more directly, while the NUV group tended to use the forest more indirectly (Fig. 5).



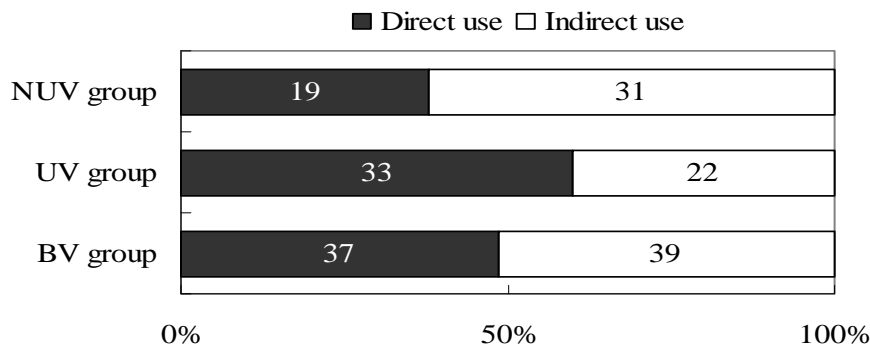
**Fig. 2** Replies to “Would you prefer that the area of maedake be increased?”  
 NUV group: respondents who selected reasons classified as the non-use value;  
 UV group: respondents who selected reasons classified as the use value;  
 BV group: respondents who selected both non-use value and use value reasons.



**Fig. 3** Frequency of present use of broadleaved forest.  
 NUV group: respondents who selected reasons classified as the non-use value;  
 UV group: respondents who selected reasons classified as the use value;  
 BV group: respondents who selected both non-use value and use value reasons.



**Fig. 4** Change of maedake use



**Fig. 5** Direct and indirect uses of maedake.

NUV group: respondents who selected reasons classified as the non-use value; UV group: respondents who selected reasons classified as the use value; BV group: respondents who selected both non-use value and use value reasons.

## Discussion

Classification of respondents based on how they valued use and non-use of the forest revealed lower awareness of forest conservation in the NUV group than in the UV and BV groups. This result suggests that local residents have greater awareness of forest conservation when they recognize its use value. As noted above, almost all residential and agricultural areas of Yakushima are near the broadleaved forest. Furthermore, village residents have used forests according to the needs of the times. These results indicate that use value is essential for developing positive feelings with respect to preserving or increasing the forest. On the other hands, local residents, who recognize only non-use value, have not directly used forests. They therefore would not try to change forests even if the area of forests then increase.

The results also reveal that the kinds of use values have changed over time. In the past, most residents used broadleaved forest for firewood or woodchips, but today they mainly use the forest for recreation or in connection with tourism. The residents should aim to preserve the forest depending on their uses. Therefore, future studies should clarify how the residents would preserve the forest.

Some residents still used the forests in traditional ways, such as for obtaining edible plants and animals. This implies that the islanders' lives are still closely connected to the natural forests. At present, firewood use is rare in Japan. However, 10 % of the respondents from Yakushima reported that they still obtain firewood from the forests. Forest policy should reflect such local characteristics of forest use.

## Reference

Kuriyama K, Kitahata T, Ooshima Y (2000) "Economics of World Heritage." Keiso shobo (in Japanese)